Pupillary block angle closure following sulcoflex piggyback intraocular lens implantation

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Abstract

We report a case of a patient who presented with blurred vision and red eye 5 days after an uneventful implantation of a sulcoflex intraocular lens for the management of postoperative refractive surprise. On examination, unilateral shallow anterior chamber with raised intraocular pressure was noted in the operated eye. Pupillary block was suspected and a therapeutic YAG laser peripheral iridotomy was performed. The final best corrected visual acuity was 20/30.

The piggy back sulcoflex intraocular lens is one of the options to address postoperative refractive surprise. The design of this lens is to prevent pupillary block. We report a case that presented with pupillary block after this procedure.

Case report

A 52-year-old man presented with a 2-day history of dysphotopsia and floaters with blurred vision in his right eye. On presentation, the macula was attached and best corrected visual acuity (BCVA) was recorded at 20/60. Dilated ophthalmoscopic examination revealed a rhegmatogenous retinal detachment involving the inferior retina in the right eye. He had bilateral laser refractive surgery (LASIK) 20 years prior to his current visit, for myopic vision correction. He underwent combined phacovitrectomy, gas and intraocular lens (IOL) implantation for a right rhegmatogenous retinal detachment (RRD). Pars plana vitrectomy was performed using 27-gauge platform with Sulphur hexafluoride (SF6) gas as an endotamponade. The preoperative axial length of the right eye was 25.57 mm with anterior chamber depth of 3.28 mm. Following phacovitrectomy, the early post op period was

uneventful, and the retina was successfully re-attached. However, after resolution of the gas bubble, UDVA was 20/200 and BCVA was recorded at 20/30 but patient complained of blurred unaided vision. Ophthalmic examination including optical coherent tomography (OCT) of the macula was unremarkable. However, subjective refraction in the affected eye revealed a residual refraction of +2.50 dioptre (D). After initial investigation for the cause of refractive surprise, it transpired that the wrong IOL was chosen from a drop-down menu on the electronic patient record (Medisoft Ltd, Leeds Innovation Centre, Leeds, UK). Had the corrected IOL been implanted using the Haigis-L formula for myopia to calculate the IOL power, we would have expected residual refraction of -0.30 dioptre. However, given the inaccuracies in IOL calculation expected in patients undergoing cataract surgery after previous corneal refractive procedures, we may have encountered a refractive surprise in spite of choosing the correct lens.

After discussion of possible treatment options, the patient opted for piggyback IOL implantation to correct the residual refractive error. The procedure was uneventful using a clear corneal incision (3.0 mm) and a cohesive viscoelastic device (OVD) (Sodium hyaluronate 1%). A monofocal non-toric sulcoflex IOL, 653L (Rayner Intraocular Lens Ltd.) was successfully implanted into the sulcus. After implantation of the IOL, the OVD was removed and intracameral cefuroxime (Aprocam®, Thea Pharmaceuticals Ltd) and acetylcholine chloride (Miochol-E®, Bausch and Lomb, UK) were injected. Five days' post-secondary intraocular lens surgery, he presented with severe ocular pain, conjunctival injection and blurred vision in the operated eye. His BCVA remained at 20/200 in the affected eye. Slit lamp examination revealed a hazy cornea and a very shallow anterior chamber (AC) with peripheral irido-corneal touch. The intraocular pressure (IOP) was recorded at 43 mmHg (measured with

Goldmann applanation tonometry). Gonioscopy showed complete (360 degrees) angle closure with iridotrabecular contact which was then reaffirmed on anterior segment OCT (Figure 1). The fellow eye had normal IOP with wide open angles. Diagnosis of pupillary block angle closure was made. After YAG laser peripheral iridotomy (PI), AC deepened dramatically and IOP dropped to 10 mmHg. Furthermore, gonioscopy showed 1+ pigmentation of the angle structure with symmetrical appearance in both eyes. A week later vision improved to BCVA of 20/30 and IOP remained normal without any antihypertensive medication (Figure 2). The final postop subjective refraction was +0.25/+0.75 x 60 with BCVA of 20/30. The patient was satisfied with the surgical outcome.

Discussion

Gayton and Saunders first described piggyback sulcus IOL (3-piece biconvex) for correction of refractive surprises almost 20 years ago[1]. However, polypseudophakia was not a popular choice then, due to interlenticular opacification, pupillary block and iris chafing secondary to biconvex IOL design[2]. As a consequence, they were soon replaced by a single-piece hydrophilic acrylic lens with rounded edges to prevent iris chafing and a concave posterior surface to reduce interlenticular opacification. Additionally, the haptics have an undulating shape with rounded edges to minimise iris chafing and a 10-degree posterior angulation to prevent pupillary block.

The new design of the single piece sulcus IOL (Sulcoflex) is meant to prevent complications previously reported with piggyback IOLs[3].

In a large series of piggy back sulcoflex IOLs for correction of postop ametropia Venter and colleagues [4] reported only 7 cases of raised IOP, which lasted 6 weeks after the operation. However, the mechanism for the raised IOP in this series of 80 eyes was not specified in the report. No cases of pupil block were noted by Kahraman et al [5], in a series of 12 eyes undergoing secondary IOL (sulcoflex 653L) implantation for correction of refractive surprises.

Similarly, Falzon et al [6] did not report any significant post-operative complications. after Sulcoflex implantation in 12 patients.

To our knowledge this is the first case of angle closure due to pupillary block following Sulcoflex IOL implantation in pseudophakic vitrectomised eye. One would expect that the special lens design would prevent such complication; hence PI is routinely not recommended for this procedure.

We speculate that in our case retained viscoelastic device between the two implants, may have pushed the lens forward and precipitated pupillary block. Based on our experience, we recommend that, surgeons should ensure complete removal of viscoelastic from behind the sulcus IOL in these cases. Secondly, IOP should be monitored post-surgery and YAG PI considered in cases of asymmetric AC shallowing and raised IOP.

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Figure 1. Anterior segment OCT shows iridotrabecular contact angle closure due to pupillary block. The star represents the cornea and the arrow points to the iris root

Figure 2. Anterior segment OCT after performing YAG laser peripheral iridotomy. The star represents the cornea and the arrow points to the iris root